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National Priority Chemicals Trends Report (2000-2004)

Section 1
Overview of the National PC Trends Report (2000-2004)

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Introduction

In 2002, the Environmental Protection Agency's (EPA) Office of Solid Waste (OSW) implemented the Resource Conservation Challenge (RCC), a program designed to reduce the use of raw materials, reuse materials to make new products or generate energy, and reduce the generation of wastes. The RCC's goals are to reduce what comes into the waste management cycle using pollution prevention, waste minimization, and manufacturing process and/or product design changes, when economically feasible.

OSW has identified 31 chemicals on which to focus its reduction efforts in wastes (Exhibit 1.1). As part of the RCC, OSW launched the National Program for Environmental Priorities (NPEP) program to reduce the presence of these 31 chemicals, referred to as the Priority Chemicals (PCs). The PCs consist of 28 organics and three metals/metal compounds that are frequently found in releases to water, air, and land. These chemicals are persistent in the environment, bioaccumulative in the food chain, and toxic to human health in relatively small quantities. They are present in soil, sediment, ground water, surface water, air, and/or biota, with a number of them serving as the basis for a waste being classified as hazardous. Furthermore, they are currently being generated (intentionally or as a product or product ingredient, a byproduct of production, or an impurity) and continue to be released to the environment potentially exacerbating existing problems and creating new ones. Many of these organic PCs also pose remediation difficulties once they find their way into the environment, resulting in costly cleanup efforts. The three metals/metal compounds were selected because they occur frequently in the Resource Conservation and Recovery Act (RCRA) waste streams and to be consistent with international efforts to which the United States made commitments.

PCs are frequently found in hazardous and non-hazardous wastes; likely opportunities for PC reduction occur in the manufacturing, commercial, and government operations that generate these wastes. EPA encourages all generators to reduce the quantity of waste they generate; however, we believe that reducing these 31 PCs should be the first priority. This reduction preferably should be achieved by reducing the use of these chemicals at the source. When reduction at the source is not possible, environmentally sound recycling practices should be used.

Moreover, the NPEP program is the RCC's most direct tool for "beyond compliance" management of the targeted PCs and forms a significant foundation upon which EPA is building its chemicals reduction and management plan. EPA recruits partners to NPEP who pledge reductions of targeted chemicals through source reduction and/or increased recycling efforts and then sets target deadlines to achieve those reductions. The NPEP program endeavors to encourage government agencies, businesses, and manufacturers to voluntarily enroll in a partnership with EPA to find ways to minimize the use of the PCs through source reduction and recycling.

The purpose of this report is to:

- Evaluate the progress made in achieving EPA's Government Performance and Results Act (GPRA) national goal of a 10 percent reduction of PCs in wastes by 2008, compared to the 2001 quantities (see Section 2).
- Provide information and trends regarding the generation and management of PC quantities (aggregated and non-aggregated) contained in wastes for the nation, EPA regions, states, industry sectors, and federal facilities to assist in identifying potential waste minimization opportunities to reduce these chemicals (see Sections 3, 4, 5, and 6).

EPA uses this Report as a tool to identify opportunities to reduce these PCs in concert with the objectives of the RCC, including assisting EPA in identifying potential partners to voluntarily participate in the NPEP program. The data and trends analyses developed for this Report support this program and helps us better understand trends in the generation and management of the PCs and identify opportunities for eliminating or reducing the PCs.

What Does This Report Cover and How Is It Organized?

Of the 31 chemicals identified by EPA as PCs, 24 chemicals are reported to the Toxics Release Inventory (TRI), as required under the Emergency Planning and Community Right To Know Act (EPCRA § 313). (Exhibit 1.1). The remaining seven PCs are not reported to TRI and therefore we do not have data regarding the generation and management of these chemicals.

In Section 2 of this Report, we evaluate the progress made toward achieving OSW's national GPRA goal of a 10 percent reduction of PCs by 2008, compared to the baseline quantity in 2001. Please note that although polychlorinated biphenyls (PCBs) are on the list of PCs and are reported to TRI, this chemical was not on the list of PCs at the time the 2008 GPRA goal was established. We also present an overview of OSW's NPEP program under which facilities generating PCs voluntarily commit to eliminate or reduce the quantity of PCs used at their facilities.

We also monitor waste generation and management trends for PCs to identify potential opportunities in PC reductions. As such, this Report presents updated analyses of the generation and management of the 24 PCs contained in wastes for the most recent five years of TRI data (2000–2004) in sections 3, 4, and 5.

Section 3 provides an overview of the national, EPA region, state, and industry sector aggregated quantities of the 24 PCs for which data are reported to TRI for the 2000 through 2004 TRI reporting years. We focus on the five most current years of TRI data to facilitate the identification of viable potential opportunities for reducing or eliminating PCs. The data presented in this section were derived using the TRI methodology (see discussion in Section 2 and Appendix C) and focus on trends for the aggregated quantity of PCs.

Section 4 of this Report presents national, EPA region, state, and industry sector (Standard Industrial Classification [SIC] code) trends for each of the 24 PCs reported to TRI. We also provide basic information regarding each PC, including its Chemical Abstracts Service (CAS) number, alternative names, general uses, and potential hazards. Due to the particularly high Agency priority of mercury and mercury compounds, we include an expanded section on this chemical in which we describe the various ongoing projects to reduce and eliminate mercury.

Section 5 of this Report analyzes federal facilities at the national, EPA region, and state levels. We also included categorization by federal agency.

Section 6 is presented for the first time in this Report. In this section, we analyze PC trends within the iron and steel industry. We also include basic information regarding the industry sector, including number and location of facilities and products made. We plan to expand this section to gradually address additional industry sectors in subsequent updates of this Report.

Several appendices also are included:

- Appendix A provides a list of the states within each EPA region.
- Appendix B shows a list of the SIC codes.
- Appendix C presents the methodology developed to identify and calculate PC quantities.
- Appendix D provides an index of exhibits as a reference guide for the reader.

Exhibit 1.1. List of the Priority Chemicals (PCs)

PCs Reported to TRI (Used in Methodology)	
1,2,4 - Trichlorobenzene	Lindane
2,4,5 - Trichlorophenol	Mercury and mercury compounds
Anthracene	Methoxychlor
Benzo(g,h,i)perylene	Naphthalene
Cadmium and cadmium compounds	Pendimethalin
Dibenzofuran	Pentachlorobenzene
Dioxins and dioxin-like compounds	Pentachlorophenol
Heptachlor	Phenanthrene
Hexachloro-1, 3-butadiene	Polychlorinated biphenyls (PCBs)*
Hexachlorobenzene	Polycyclic aromatic compounds (PACs)
Hexachloroethane	Quintozene
Lead and lead compounds	Trifluralin
PCs Not Reported to TRI (Not Used in Methodology)	
1,2,4,5-Tetrachlorobenzene	Endosulfan, alpha, beta-
4-Bromophenyl phenyl ether	Fluorene
Acenaphthene	Pyrene
Acenaphthylene	

For the purposes of developing this list of 31chemicals, endosulfan alpha and endosulfan beta were counted together and heptachlor and heptachlor epoxide were counted together. Also, each of the three metals (lead, cadmium, and mercury) is combined with its associated metal compounds and addressed as a single PC in this Report. For example, lead and lead compounds are addressed as a single PC. Only the weight of the metal portion of metal compounds is reported to TRI.

* Note: Although polychlorinated biphenyls (PCBs) are reported to TRI, they are not one of the PCs tracked for the 2008 GPRA goal that is discussed in Section 2.

What Is the Source of the Data Used in This Report?

For this Report, we use the Toxics Release Inventory (TRI) data as the source of information to analyze and identify trends regarding the extent to which PC quantities have increased or decreased over time, the EPA regions and states where each of these PCs are generated, and the industry sectors that generate/manage these chemicals. The TRI is a publicly available EPA database that contains information on more than 650 chemicals that are being used, manufactured, treated, transported, released into the environment, or recycled. Facilities report this information annually, and EPA reviews and updates the data on an ongoing basis, when necessary to make corrections submitted by facilities.[5]

The TRI covers a wide variety of industry sectors, including those in manufacturing (i.e., SIC codes 20 through 39). These industry sectors also account for more than 90 percent of the hazardous waste generated in the United States.[6,7] Facilities in these manufacturing sectors have been required to report to the TRI since its inception. Beginning with reporting year 1994, federal facilities also have been required to report to the TRI. A further expansion of TRI reporting occurred in 1998 when seven sectors were added: Metal mining (SIC code 10, except 1011, 1081, and 1094), Coal mining (SIC code 12, except 1241), Electrical utilities that combust coal (SIC codes 4911, 4931, and 4939), RCRA Subtitle C Hazardous Waste Treatment and Disposal Facilities (SIC code 4953), Chemical wholesalers (SIC code 5169), Petroleum

[5] Data for each year are published within approximately 18 months following the end of the reporting year. For example, data for reporting year 2004 (deadline for reporting to TRI was July 1, 2005) were published April 12, 2006.

[6] Studies conducted in the early 1990s to determine whether TRI quantities were representative of RCRA waste concluded that the TRI covers a large portion of the hazardous waste generated in the United States. For additional information on these studies and their findings, refer to Bhatnagar, S., and B.C. Murray; *Efforts to Link the Biennial Reporting System (BRS) and the Toxics Release Inventory (TRI)* (prepared for EPA's Office of Solid Waste); 1997.

[7] A study conducted in 1995 found that more than 93 percent of hazardous waste was generated at facilities also covered under the TRI. For additional information on this study, refer to INFORM, Inc.; *Toxics Watch 1995*; 1995.

terminals and bulk stations (SIC code 5171), and Solvent recovery services (SIC code 7389). Facilities in additional industry sectors also report to the TRI even though they are not required to do so. The database developed for use in this Report includes all facilities, regardless of SIC code (except as noted in the methodology [Appendix C] that reported a PC quantity to TRI for reporting years 2000–2004.

What Measurement Methodology Was Used for This Report?

Facilities report information to the TRI on a chemical-specific basis, rather than by hazardous waste stream. Data reported to TRI include quantities of chemicals that are contained in the waste and provide some distinctions between hazardous and non-hazardous industrial waste. The primary focus of OSW is those quantities of PCs that are amenable to waste minimization. As such, this Report is keyed to those quantities of PCs that are managed using onsite/offsite land disposal, treatment, or energy recovery. We developed a measurement methodology[8] (see Appendix C) to extract the applicable data from the TRI database that encompass these PC quantities and exclude quantities reported by facilities within certain industry sectors that present minimal waste minimization opportunity. As such, the data used for this Report are a subset of the overall TRI data.

How Does EPA Ensure the Quality of the Data Used in This Report?

It is important to ensure that the TRI data used in the measurement methodology is accurate. Otherwise, errors in the data could lead to an incorrect interpretation of the trends. Primary responsibility for quality of the TRI data rests with EPA's Office of Environmental Information (OEI). We primarily rely on the OEI data quality checks and the ever-improving TRI-ME reporting software to minimize mistakes in the TRI data used for the PC database. The TRI program takes several steps to ensure the quality of its data, including examining a sample of individual reports for potential errors; however, undetected reporting errors may still occur.

For the subset of TRI data that OSW uses to develop the PCs database, it is sometimes necessary to supplement the OEI data quality checks to ensure that there are no significant discrepancies in the more limited universe of facilities associated with the PCs – discrepancies that might not necessarily have been addressed in the broader OEI data quality checks but that could potentially skew the trends and analyses for the PCs. The purpose of these supplemental data quality checks is to identify those changes in the quantity of a PC reported to TRI over two consecutive reporting years that are of sufficient magnitude to potentially have a significant affect on the trends analysis for that PC. To the extent that time and resources permit, we conduct these data checks to verify the PC quantities reported by a given facility. Reporting errors might not always be very noticeable in aggregated quantities at national, state, or even industry sector-level analyses, but they can have a major effect when looking at trends at the facility level, especially for those chemicals reported by an overall small number of facilities or by a few facilities that account for a large portion of the total quantity of a PC. Once we complete the supplemental data checks and incorporate any changes to the database, we "freeze" it and proceed to develop the tables and queries needed to analyze the PCs trends. Once the database is frozen, we do not further modify it to incorporate any TRI reporting errors subsequently identified. We depend on OEI to include them in the next year's TRI dataset, provided that the reporting facility submits a revised TRI Form R to EPA.

Although we ideally strive to determine the quantities of PCs that are contained in wastes amenable to waste minimization, often an increase or decrease at a facility is not necessarily related to production but rather is influenced by other factors such as process or plant shutdowns, periodic cleanout of tanks, or piping systems that are part of routine maintenance, improved measurement and detection equipment, and compliance with new regulations. We often cannot readily discern that an increase or decrease of PC

[8] Please note that the methodology used in developing this Report might differ from the methodology used by the TRI program to show trends for the EPCRA Section 313 chemicals in the annual TRI Public Data Release.

quantities was associated with such an event and may only learn about it as a result of conducting quality assurance of the data by, for example, contacting the facility to verify a significant change from one year to another.

We provide additional details concerning the steps taken in this process in Appendix C.

Seven of the PCs are not reported to TRI (Exhibit 1.1), and we do not have a readily available means by which to track them. EPA is continuing to work on developing a methodology to extract information about these chemicals, if available, from the RCRA Hazardous Waste Biennial Report (BR) database. Each of these seven PCs is described at the end of Section 4.

What Might Change in Future Updates of This Report

- In this Report, we discuss progress made toward the 2008 GPRA goal, which uses TRI data that lag more than a year and are greatly influenced by market forces. OSW recently established a new goal, referred to as the 2011 GPRA goal. This goal uses current data from facility partners who agree to reduce their PC wastes, so it better reflects our own waste minimization program efforts. In next year's Report, we will begin reporting progress made toward each of these goals.
- OSW will continue to use TRI data to track long-term PC trends and to look for waste minimization opportunities in industry sectors. We plan to include additional industry sector analyses in next year's Report, focusing on those industry sectors that account for at least 80 percent of the total quantity of PCs, based on TRI data. Beginning with the 2006 TRI reporting year, facilities must report a North American Industrial Classification System (NAICS) code rather than the SIC code that has been reported since TRI reporting began in 1987. This transition somewhat complicates trends analyses at the industry sector level; we are looking at options on how best to present these analyses in future Reports.
- We are continuing to develop a methodology to extract Hazardous Waste BR data applicable to PCs in hazardous waste streams. We plan to use these data, in conjunction with the TRI data, to provide a better picture of which specific waste streams offer the most promising waste minimization opportunities.

This Report is an evolving document, and we continue to look for ways to better present the data. For example, we plan to continue incorporating improved graphics to enhance the presentation of data in this Report. We also are considering formatting changes to provide a more reader-friendly document. For example, rather than presenting PC data breakouts by national, EPA region, state, and industry sector levels, we plan to simply address these within a "PC Generation" and a "PC Management" format. We believe this approach will provide a simpler and more condensed discussion of the data. If you have any comments regarding this approach, you may use the Customer Feedback Survey at the end of this Report.

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